

PLEASE RETURN TO R&D LAB

ROGERS
ENG-6-097

ATTN : Chief, Supplemental Programs Division, OC
 Chief, ELINT Activities Branch, OC
 Chief, Engineering Division, OC

25 January 1956

Progress Report, [REDACTED]

25X1

REF : Memorandum SP/EA 5-236 from Chief, SP/EA to Chief, Engineering Division dated 1 November 1955

1. The purpose of this memorandum is to summarize the status of the [REDACTED] and to indicate the trend of the development work currently being conducted at the R&D Laboratory. Time estimates for completion of the project with available manpower are also included for your planning purposes.

25X1

2. The feasibility of the system has been established by preliminary studies. At present, attention is directed to the details of the design and construction of an engineering model. Tentative plans indicate that the fabrication of this model will proceed along the following lines:

A. RF Section

The RF Section will use a horn antenna feeding a "Microstrip" video crystal mount. The horn antenna appears to be the most promising type in view of the bandwidth and size requirements.

B. Video Amplifier

The transistorized video amplifier currently under development in the R&D Laboratory can be incorporated directly into the system.

C. Demand Feature

The demand feature will employ a transistor switch which will enable the output of the video amplifier to activate a miniature relay.

D. Recorder

A Minifon Recorder has been procured for use as the recording element. This recorder has a 2-hour recording capacity; however, a unit which has a 5-hour capacity is being procured.

DOC	7	REV DATE	2-12-80	BY	008632
ORIG COMP		CPI		TYPE	
ORIG CLASS	5	PAGES	13	REV	C
JUST	22	NEXT REV	2010	AUTH	US 10-2

CONFIDENTIAL

PLEASE RETURN TO R&D LAB

SECRET

3. The possibility of providing crystal protection, in the presence of very high radiation intensities from nearby ship or shore based installations, is the only major item which has not yet been studied. This problem will also receive attention.

4. It is estimated that a model will be completed in approximately two months and that a final prototype will be available in approximately five months.

5. It should be noted that the above estimates are based upon the expected early delivery of the environmental test unit (cold chamber) and certain components of the microwave test equipment both of which are essential to the determination of system parameters and to the final testing of the completed prototype.

6. Attention is invited to two possible additions which appear to increase the operational flexibility of the original proposal.

A. Multichannel Response

It is possible to divide the desired spectrum into three channels with microstrip filters and to incorporate a coding circuit to indicate the frequency range being recorded.

B. Daily Calibration

It may be possible to develop a photosensitive circuit to code the wire so as to permit the determination of the date on which signals are received.

7. At this stage of the development, an accurate estimate of the additional time required to include the above functions is difficult to make. However, it appears that at least three months additional time should be allowed. A more accurate estimate can be made at the completion of the single-channel model, and if, at that time, the inclusion of the features described above appears desirable, another estimate will be submitted upon request.

WMS
ACS
R&D/Lab/ACS/jcm (24 January 1956)

Distribution:

Original and 1 - Addressee/
1 - R&D Lab ✓
1 - R&D Chrono

1 - OC-E Chrono
1 - Dev/s

SECRET

25X1

STANDARD FORM NO. 64

SECRET

Office Memorandum • UNITED STATES GOVERNMENT

TO : Chief, Communications Engineering Division, OC DATE: 1 November 1955

FROM : Chief, ELINT Activities Branch

SUBJECT: Modifications [redacted]

25X1

1. In order to clarify our requirements on the modifications to be incorporated into [redacted] which was delivered to your Division along with a verbal outline of the requirements and operational usage of this unit, the following is offered as a guide.

25X1

2. It is our understanding that presently there has not been any work or planning accomplished on the unit pending receipt of the units lens, filter [redacted] While it is understood that these items will determine and establish such factors as attenuation, ambient heat protection and possibly antenna size and configuration, much could be done to establish the layout and integral construction of the data recording and video system to be incorporated into the unit.

25X1

3. At present, the following broad requirements are stated which will meet the operational usage of the equipment.

A. Antenna or antennae to permit recovery of signals within the "S" and "X" Radar Bands. Consideration should be given to the possibility of utilizing tuned slots in the unit case which can be [redacted] incorporation of the printed antennae now under development at the R&D Laboratory.

25X1

25X1

B. Detection of the video component of the signals through use of a crystal detector of low noise factor.

C. Amplification of the detected video component by means of a transistorized video amplifier. Consideration should be given to the transistorized video amplifier now under construction by the R&D Laboratory for this Division.

D. Provision be made to record the data on magnetic wire with a capacity of 2 hrs. minimum and preferably 5 hr. capacity. No erase or playback features required in the unit.

E. Incorporation of a demand feature to initiate the recorder only when the system is illuminated by presence of signals.

F. Mechanical switching be provided to permit start/stop of the equipment externally. [redacted]

This is really going to take space and energy. Will not the Elgin times eliminate the need for this? 5/13/55

25X1

SECRET

SECRET

Sr/EA-5-236
Page 2

[redacted] In the event the demand feature described above is incorporated, this switching arrangement must be capable of by-passing this feature.

25X1

4. It should be understood that none of the above can be allowed to change the configuration [redacted]


25X1

25X1

25X1

Distribution:
Orig & 1

SECRET

TRANSMITTAL SLIP		DATE 24 February 1956	
TO:		R&D/IP	
ROOM NO.	BUILDING		
REMARKS: Per your request dated 26 January 1956. REF: Request No. 40. 			
FROM: Library			
ROOM NO.	BUILDING	EXTENSION	

25X1

25X1

25X1

SECRET

16 FEB 1956

Dear Sir:

Reference is made to your Memorandum dated 8 February 1956, Control No. LD-5735.1, Subject: Request for Documents. The inclosed correspondence is forwarded for your information and retention.

The overall classification of this correspondence is SECRET, paragraph 23d, AFR 205-1.

Sincerely,

1 Incl
DF dtd 5 Jan 53,
Cmt 1, "MNR (M)"
w/Cmt 2 dtd 13 Jan 53
(SECRET) T53-031

WALLACE W. ELWOOD
1st Lt., USAF
Assistant Adjutant

SECRET

T56-3230

<h1 style="text-align: center;">DISPOSITION FORM</h1> <h2 style="text-align: center;">SECRET</h2>		SECURITY CLASSIFICATION (If any) SECRET AUTH: CG, ATIC BY: Major Patrick J. Ness DATE: 5 Jan 53	
FILE NO.	SUBJECT (SECRET) Minature Wire Recorder (Minifon)		
THRU: ATIA TO: ATIAE	FROM: ATIRG-2	DATE: 5 Jan 53 Capt Lochr/ef 65372/B263-C	COMMENT NO. 1
<p>1. It is requested that information be furnished this office indicating the status of the test of the Minifon Recorder which was forwarded to your section for analysis by the Communications and Navigation Laboratory, WADC, on 2 October 1952.</p> <p>2. Information has been received by this office which indicates that tests and analysis of this piece of equipment have been completed, however, as yet no report has been received.</p> <p>3. It is requested that the Minifon Wire Recorder be returned to this office as soon as possible.</p>			
ROY D. CAPE, Colonel, USAF Chief, Technical Requirements Division Air Technical Intelligence Center			
<h2 style="font-size: 2em;">SECRET</h2>			

DD FORM 96

SECRET

AUTH. CG ATIA

BY: V.E. [unclear]

DATE: _____

SUBJECT: (SECRET) Miniature Wire Recorder (Miniwom)

TO: ATTRC-2

FROM: ATIAE-3

DATE: 13 Jan 53

Comment

Mr. N.T. Sincopoulas

69368/B263A/P-126

1. In regard to Comment No. 1 the following questions were asked Mr. Theroux
 - a. Frequency response
 - b. Approximate range (distance at which voice can be recorded).
 - c. Investigate and give approximate life of the batteries under normal operating conditions. (Could a type of U.S. Manufactured batteries be used?)
 - d. Investigate the recording circuit and briefly summarize the characteristics of the recording circuits and note any suggested improvements.
 - e. Briefly investigate the requirements for water proofing and ability to withstand shocks.

2. The following are comments received from Mr. Theroux of WABG:

- a. Frequency response:

The following response was obtained when operating at normal speed of 12" second. Somewhat higher speed with proportionate increase in response is obtainable on fresh batteries. A speed of 16"/second is obtainable with fresh batteries. Operation at very low speed increases motor current considerably, since speed control is by a centrifugal function governor. It would be best to make recordings at 12"/second in order to assure adequate playback speed with partially used-up batteries.

<u>cps</u>	<u>db</u>
300	7
400	10
500	14
700	18
1000	23
1500	31
2000	31
3000	26
4000	16
5000	11
no signal	6

- b. Approximate range:

With the microphone furnished a range of 10ft indoors and 6ft outdoors was obtained. When operating at maximum gain an input of 3 millivolts is required to record full strength. Intelligibility was better when using an MB-33 instead of the headphones furnished.

SECRET

SECRET

JAN 30 1953

(40) Minifon Recorder (Minifon)

Battery Life

The motor consumed 60ma at 9 volts. The plate supply requires 100ma at 30 volts. The filaments require 30 ma at 1.5 volts. Battery life is estimated as 10 hours for the filament battery, 10 hours for the B battery, and 10 hours for the plate battery. Commercial U.S. batteries could be used for the filament and plate supplies interchangeably with the German batteries. For the motor supply, seven mercury cells could be used in series as a substitute for the 2 parallel 9 volt German batteries. A suitable fixture would have to be installed to hold the mercury cells. A standard pen-light cell (BA-58), can be used for the filaments and a 30 volt hearing aid battery (Evsready No. 413) can be used for the plate supply.

d. D.C. bias is used in the recording circuit. A permanent magnet is used for erase. A three tube resistance coupled amplifier is used with a transformer on the output. When recording the head is switched into the plate circuit of the output tube. When playing back the head is switched to the grid of the input tube. Response could probably be extended another 1000 cps by use of a resonance capacitor across the head. The low frequency losses exceed the 6 db per octave frequency effect that should be expected in an uncompensated recording. This indicates that the low frequency response of the amplifier is poor. Distortion was high, indicating that biasing was not optimum, although some distortion was probably due to the amplifier. The noise output remains the same whether or not the wire is contacting the head. This indicates that the signal to noise ratio would be improved if the amplifier was quieter. The noise is probably due to the use of a noisy type resistor in the plate circuit of the first stage.

e. Waterproofing would require the use of soft rubber bushings or o-rings on the two control switches and the jack. A membrane over the volume control and a tape seal around the edge of the cover would also be needed. Probably the easiest solution would be to place the entire recorder in a thin plastic bag. The controls would still be easy to work. Some sort of sealing compound would be needed where the microphone cord passes thru the bag, unless the microphone could be left in the bag. If it is to be used in an airplane some sort of relief valve would be necessary to prevent ballooning of the bag. When in its carrying case the recorder has good resistance to moderate shocks, such as dropping 6 inches to a hard surface while operating.

2 Incls

1. Minifon Recorder
2. Minifon Accessories

Ray W. McDuffee
 RAY W. McDUFFEE, Colonel, USAF
 Chief, Technical Analysis Division
 Air Technical Intelligence Center

SECRET

SECURITY INFORMATION

SECRET

831

RED - POSITIVE MOTOR

~~Purple - Neg MOTOR interchange~~~~Yellow~~~~HEAD~~

Symbol

~~CHARACTER~~

Value

R ₁	Bias	3.9 meg
R ₂	Collector	30 K
R ₃	Collector	39 K
R ₄	Bias	3.3 meg
R ₅	Collector	20 K
R ₆	Bias	1.6 meg
R ₇	Collector	16 K
R ₈	Video dropping	39 K
R ₉	variable series input	0 - 500 K Ω pot
R ₁₀	Series input	47 K Ω
R ₁₁	Bias	.11 meg
R ₁₂	stabilizing	20 K
R ₁₃	Collector	18 K
R ₁₄	Stabilizing	3.9 K
R ₁₅	Bias	68 K Ω
R ₁₆	Stabilizing	20 K
R ₁₇	Collector	18 K
R ₁₈	Stabilizing	3.9 K
R ₁₉	Bias	47 K
R ₂₀	Stabilizing	12 K
R ₂₁	Stabilizing	2.4 K
R ₂₂	current equalizing	200 Ω 1 watt
R ₂₃	Sensitivity control	0-100 Ω pot

undesignated

All resistors are 1/2 watt.

R₂₄(?) ~~39~~ Dropping resistor - 39 ohms 2 watt

C ₁	input coupling	0.1 micro
C ₂	coupling	"
C ₃	"	"
C ₄	"	"
C ₅	"	"
C ₆	pulse stretching	270 mmt mica
C ₇	coupling	0.1 micro
C ₈	bypass	10 mmt / 25 v. tantalum
C ₉	coupling	0.1 micro
C ₁₀	bypass	10 mmt / 25 v. tantalum
C ₁₁	"	"
C ₁₂	filter	175 mmt. / 15 v. tantalum
C ₁₃	"	"
C ₁₄	"	"
C ₁₅	pulse stretching	2 mmt / 100 volt. tantalum
C ₁₆	noise suppression	100 mmt / 50 volt tant. (?)
C ₁₇	time lag	100 mmt / 30 volt tant

T₁ Record head output 2000-10,000 Ω
 (Argonne ^{one} No. AR-109)
 T₂ Driver 400 - 20,000 ohm
 20,000 \rightarrow 400 Ω (Argonne No. AR-125)

L₁ Motor noise choke 60 mh 100 ma
 (Miller # 693)
 L₂ Motor noise choke 150 mh 100 ma
 (Miller # 961)

* See below

RELAY 1 Locking

~~RELAY 2 Motor energizing~~

RELAY 3 Transient suppression

RELAY 4 Audio switching

Elgin "Hermit" NM2K

2000 Ω dc coil

100 mw sensitivity

Coil Resistance (dc): 2000 ohm
 Sensitivity: 100 mw

SW-1 ^{Function} Time switch (Microswitch 15M1) switch
~~connected to cam on M-1~~

SW-2 ^{Function} ON-OFF switch (Centralab Rotary ceramic)

M-1 ^{Function} Timing motor (Haydon Series 9200)
 Speed 0.70 ma, 1/5 RPM.

M-2 ^{Function} Recording motor - from (MINIFON)
 Speed 9 v. at ~~approx~~ 100 ma

*

Relay 1-2 Locking and Motor Energizing - GE Microminiature
 relay, current sensitive
 model, 720 Ω coil
 resistance, 150 mw
 Coil Resistance: 720 ohms.
 sensitivity: 150 mw.
 (GE Microminiature)

